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FLOOD INSURANCE STUDY

VILLAGE OF HAMDEN, OHIO

VINTON COUNTY

SEPTEMBER 29, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER: 390554

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY

VILLAGE OF HAMDEN,
VINTON COUNTY,
OHIO

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Hamden, Vinton County, Ohio, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey (USGS) (the Study Contractor) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 18. This study was completed in April 1988.

1.3 Coordination

A coordination meeting was held on January 17, 1985, and was attended by the Mayor and Clerk Council of the Village of Hamden and representatives of FEMA and the Study Contractor. The primary purpose of this meeting was to determine the areas of the village to be included in the study.

On November 22, 1988, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the Study Contractor, FEMA, and the community.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Hamden, Vinton County, Ohio. The area of study is shown on the Vicinity Map (Figure 1).

Flooding caused by overflow of Little Raccoon Creek and Tripp Run was studied in detail.

Areas having low development potential or minimal flood hazards were previously studied using approximate analyses. The results were shown on the Flood Hazard Boundary Map for the Village of Hamden (Reference 1) and are incorporated into this Flood Insurance Study.

The areas studied were selected with priority given to all known flood hazard areas and areas of projected development or proposed construction through April 1993. The scope and methods of study were proposed to and agreed upon by FEMA and the Village of Hamden.

2.2 Community Description

The Village of Hamden is in Vinton County, Ohio, and is surrounded by the unincorporated areas of the county. The community is served by State Routes 160 and 349 and the CSX railroad. The 1980 population of Hamden was reported to be 1,011 (Reference 2).

2.3 Principal Flood Problems

The low-lying areas adjacent to Little Raccoon Creek and Tripp Run within Hamden are subject to periodic flooding.

2.4 Flood Protection Measures

Flood protection measures are not known to exist within the study area. The Lake Rupert Dam, which is 1.4 miles upstream of the confluence of Tripp Run on Little Raccoon Creek, does not provide protection from the 100-year flood.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that is expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF HAMDEN, OH
(VINTON CO.)

APPROXIMATE SCALE

1 0 1 2 3 MILES

VICINITY MAP

than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

The magnitude of the discharges for the 100-year recurrence interval was determined by methods of regional analyses outlined in Ohio Department of Natural Resources Bulletin No. 45 (Reference 3). Those methods consist of regression equations that use topographic and climatologic characteristics of the basin, based on regional analyses, to develop a flood-frequency curve. The equations are power equations based on drainage area and main-channel slope. There is no stream-gage data available for Little Raccoon Creek, which is regulated at lower flows by Lake Rupert Dam. Analysis of the storage capacity of the reservoir determined that the reservoir would not significantly affect the 100-year peak discharge; therefore, no adjustments were made to the calculated discharges. Tripp Run is unregulated and there are no stream-gage data available; therefore, no adjustments to the calculated discharges were made.

Peak discharge-drainage area relationships for the 100-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS*) 100-YEAR
LITTLE RACCOON CREEK		
at Vinton-Jackson county boundary	36.1	6,170
just upstream of confluence of Sugar Run	28.2	5,300
just downstream of Lake Rupert	22.2	4,900
TRIPP RUN		
at mouth	0.95	666

*cubic feet per second

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections were determined from field survey. Additional sections were synthesized using topographic maps (Reference 4). Structural geometry and elevations for bridges were determined from field survey.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles and on the Flood Insurance Rate Map.

Roughness coefficients (Manning's "n") for Little Raccoon Creek range from 0.03 to 0.06 for the channel and from 0.03 to 0.10 for the overbank areas. Values for Tripp Run range from 0.03 to 0.055 for the channel and from 0.035 to 0.10 for the overbank areas.

Water-surface elevations for the 100-year flood were computed using WSPRO, a step-backwater computer program (Reference 5). The starting water-surface elevation for Little Raccoon Creek and Tripp Run were determined by the slope-conveyance method using data obtained from field surveys.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the map and described in the exhibit labeled Elevation Reference Marks.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries

were interpolated using topographic maps at a scale of 1:4800 with a contour interval of 2 feet (Reference 4).

The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map. On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, AH, AO, A99, V, and VE) and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

For the streams studied by approximate methods, only the 100-year floodplain boundary was delineated using the Flood Hazard Boundary Map for the Village of Hamden (Reference 1).

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces the flood-carrying capacity, increases the flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum Federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways for this study were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross sections and are shown in Table 2, Floodway Data. The computed floodways are shown on the Flood Insurance Rate Map. In cases where the floodway and 100-year floodplain boundaries are either close together or collinear, only the floodway boundary is shown. Portions of the floodway for Little Raccoon Creek lie outside the corporate limits.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (FEET NGVD)	WITHOUT FLOODWAY (FEET NGVD)	WITH FLOODWAY (FEET NGVD)	INCREASE (FEET)
LITTLE RACCOON CREEK								
A	3470	1383[2]	1383	4.5	683.9	683.9	684.0	0.1
B	4050	1680[2]	8238	0.6	684.1	684.1	684.9	0.8
C	5000	1440[3]	6756	0.8	684.2	684.2	685.0	0.8

[1]FEET ABOVE STATE ROUTE 349
[2]THIS WIDTH EXTENDS BEYOND CORPORATE LIMITS
[3]THIS WIDTH IS BEYOND CORPORATE LIMITS

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF HAMDEN, OH
(VINTON CO.)

FLOODWAY DATA

LITTLE RACCOON CREEK

Along streams where floodways have not been computed, the community must ensure that the cumulative effect of development in the floodplain will not cause more than 1.0-foot increase in the base flood elevations at any point within the community. No floodway was computed for Tripp Run.

The area between the floodway and the 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

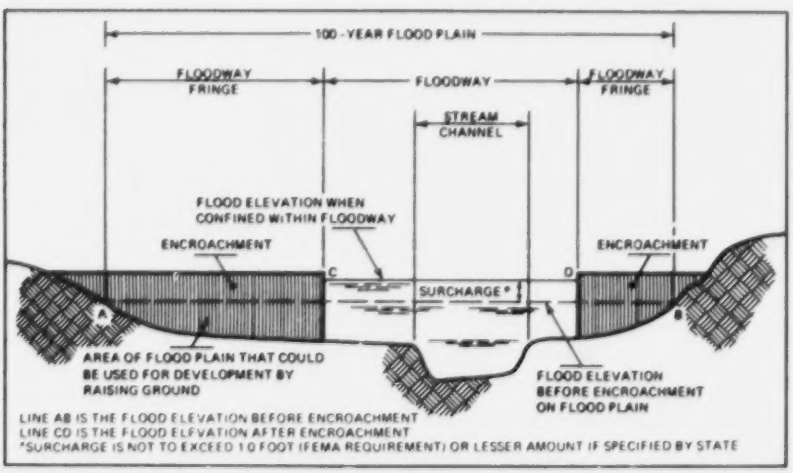

100-YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 100-year floodplain, areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols the 100- and 500-year floodplains, the floodways, and the locations of selected cross sections used in the hydraulic analyses and floodway computations.

7.0 OTHER STUDIES

This Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for the Village of Hamden (Reference 1).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, FEMA, 175 West Jackson Boulevard, 4th Floor, Chicago, Illinois 60604-2698.

9.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Village of Hamden, Vinton County, Ohio, December 1976.

2. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Ohio, Washington, D.C., February 1982.

3. Ohio Department of Natural Resources, Division of Water, Bulletin No. 45, Floods in Ohio, Magnitude and Frequency, E.E. Webber and W.P. Bartlett, Jr., December 1976.

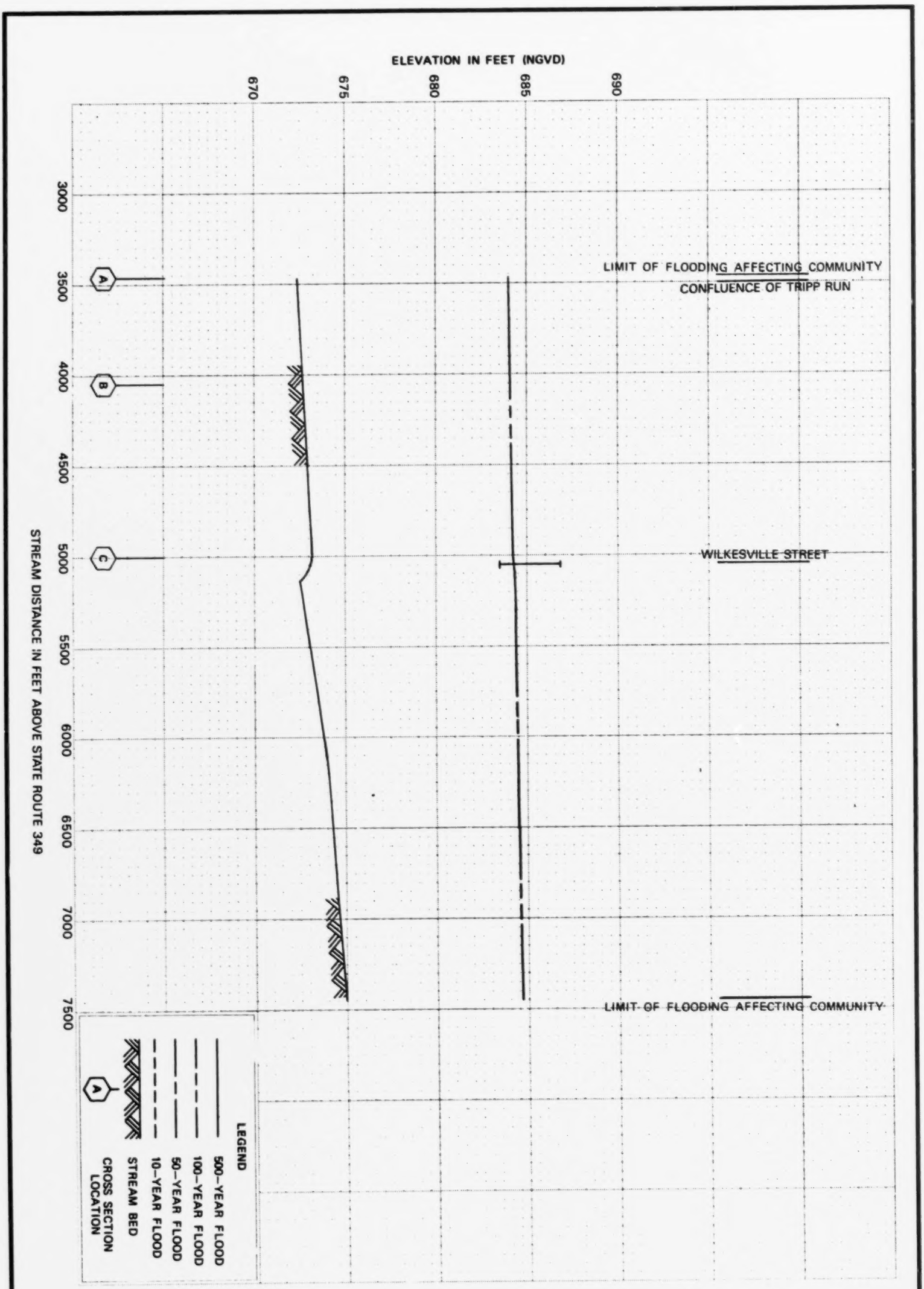
4. Air Maps Inc., Topographic Map of the Village of Hamden, Scale 1:4800, Contour Interval 2 Feet: Hamden, Ohio, November 1986.

5. U.S. Department of Transportation, Federal Highway Administration, Report No. FWHA/RD-86/108, Bridge Waterways Analysis Model: Research Report, J.O. Shearman, W.H. Kirby, V.R. Snyder, and H.N. Flippo, July 1986.

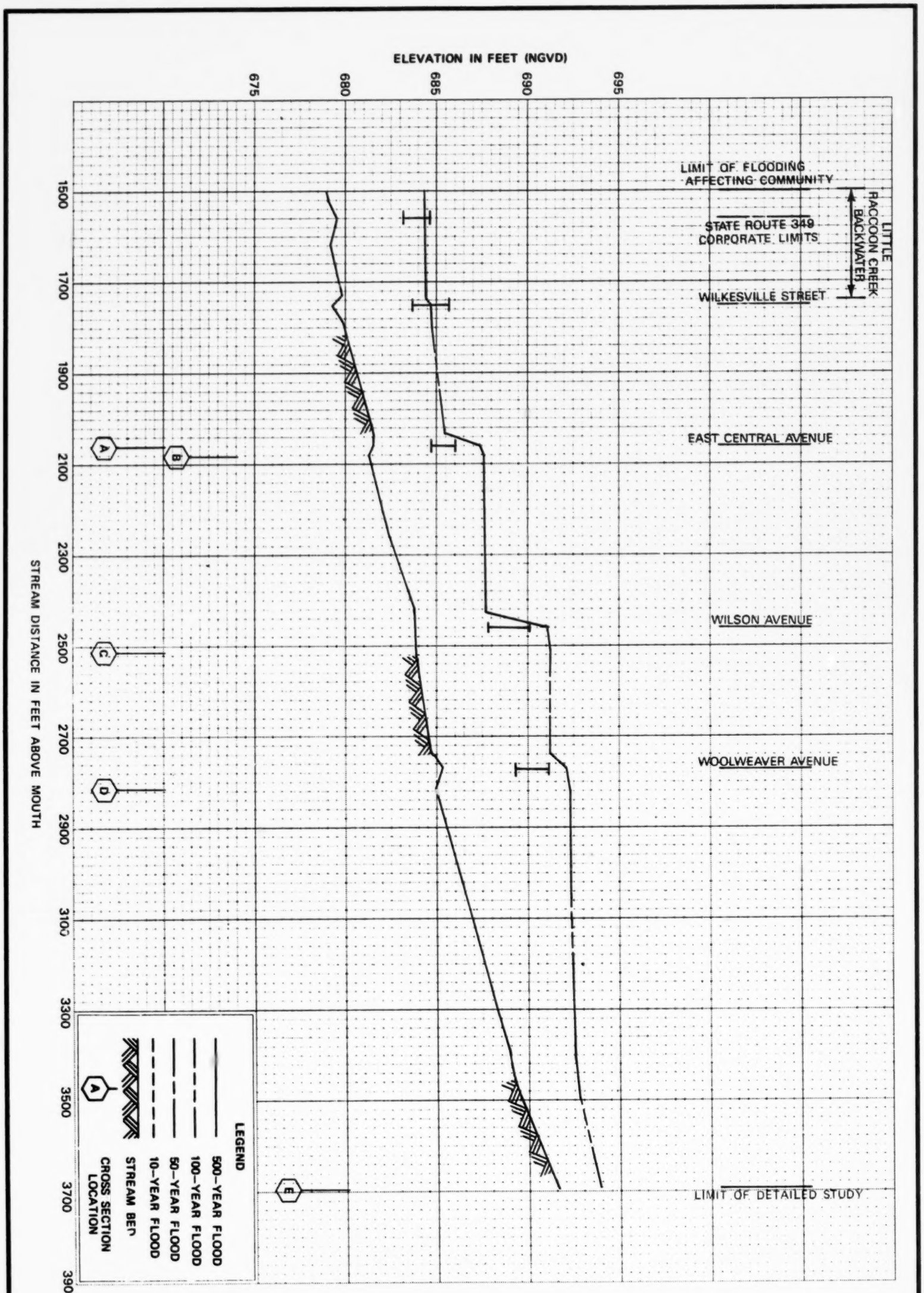
U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 20 Feet: Hamden, Ohio, 1961; photorevised 1975.

ELEVATION REFERENCE MARKS

REFERENCE MARK	FLOOD INSURANCE RATE MAP PANEL	ELEVATION (FEET NGVD)	DESCRIPTION OF LOCATION
1	0001	707.05	standard tablet stamped "Y220 1958" set in top of northeast end of headwall of stone culvert located under intersection of CSX railroad tracks and Main Street
2	0001	685.57	chiseled square on southeast corner of southeast abutment of Wilkesville Street bridge over Tripp Run



01P	FEDERAL EMERGENCY MANAGEMENT AGENCY **VILLAGE OF HAMDEN, OH** (VINTON CO.)	**FLOOD PROFILES** **LITTLE RACCOON CREEK**



02P

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF HAMDEN, OH
(VINTON CO.)

FLOOD PROFILES

TRIPP RUN